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SUGATO PULSE ACT ON CIRCULAR RYDBERG ATOMS

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ABSTRACT

I explore theoretically the performance of circular Rydberg atoms work on Sugato pulse in non-classical mechanics in the state of decoherence state. Sugato pulse in informatics wave dynamic is to be determined as resonating density operator of fock state |η> photon distribution. In addition to that the pulse also determines Rydberg ion chips into the decomposition state. I also performed through reconstruction process with density operator to find its iterative function. The pulse also act on interpolate and extrapolate activation. It also determines the Rydberg atom in the condensed state.

KEYWORDS: Sugato Pulse, Interpolate, Extrapolate, Condensation

INTRODUCTION

Non-classical wave dynamic in decoherence state of wave pulse [1] in the quantum tools of wave design acted on the circular Rydberg atom [2] is the physical system in the wave dynamic of the Rydberg atom with its informatics and wave pulse acted on cavity field with Ramsey interferometer [2] is constructed function operation of Sugato wave pulse [1] with maximum probability of detecting wave dense with phase φ. The pulse acted on atom chips allows trapping ultra clod atomic gases in the vicinity of micron-sized current carrying wires [3] with the fixed of Rydberg ion chips of state vector null to infinity onto the decomposition of successive thin coherence growth [1] transformation with the tools of Maxlik reconstruction method [4, 5] seeks in general a density operator ρ measuring wave cloud dense being acts as a sequential operator. The innovation of Sugato Pulse act on atom interpolate and extrapolate activation discuss in these paper. The pulse wave will generate in condensation state of Circular Rydberg atoms also discussion topic.

SUGATO PULSE IN INTERFEROMETERICES WAVE DYNAMIC

Non Classical wave dynamic in decoherence state with the Sugato pulse acted in the atom, the active pulse wave resonance which is a powerful tools in the quantum mechanics. The evidence of utility function resonate in the field vector (active) in the decoherence state, the atom in the active pulse interact with respect to wave transformation into the coherence of the field measuring in the cavity onto the low decoherence high microwave transformation in the atom dipole-dipole interaction on the circular Rydberg atoms. The number of Rydberg atoms in a single sample obeys a Poisson Law with an average ≈. 8 [2]. The microwave field is probed by a succession of rubidium atom samples, prepared in a Box B [2] into the circular Rydberg state g or e with the principal quantum number 50 and 51 [2]. Each atom undergoes $\frac{\Pi}{2}$ microwave pulse mixing e and g in the low –Q cavities R_1 and R_2 fed by the classical source S, Which constitute a Ramsey interferometer [2]. The circular Rydberg atoms in the mixing e and g state with resonance of wave component with the dummy wave growth being in a phase transformation with it optic colour as a transfer pseudo pulse in the phase shift transformation with a velocity v with its time ratio [6] in the sense of generating a chromatic wave phase transformation in the field ionization $\omega_1 \to \omega_1 + \delta$, the δ in additive time ratio of its phase rotation in the Ramsey interferometry

transformation of axis dense ρ_{Υ} with an operative pulse into the rotating phase into vacuue state interfarometric phase. The measurement of φ(x) by Ramsey interferometry provides information about the photon number distribution of the Sugato inter phase [7] into a hard leaser pulse transformation with a rotation of phase pole with its additive time sense in an optimal singularity of atom activation with minimum 0, i complex field phase with maximum 3Π/2, j complex field phase in a rotating orbit as a Sugato active pulse act into dummy pulse resonance to real value constant function, with Rubidium probable dense factor in the functional operator $\sum_{n=i}^{n=j} f(\eta_1)|\eta_1 >< \eta_2|$ where η_1 & η_2 is the positive wave pick value of the Ramsey interfarometric although the polar mixing e and g acts as transfer orbital energy growth. The complex vector i into the positive value induced colour in the interfarometric transformation will give to maximum n fock photon number also the complex vector will give to as resonating density operator of fock state |n> photon distribution. The distribution function associated with atomic detection state

$$\overline{E_{\Phi_{\gamma_i \gamma_j}}} = 0\sim\Pi/2\sim3\Pi/2\ \gamma_{\Phi}(\overline{\eta}, \varphi) \tag{1}$$

Where γ_{Φ} is the maximum polar rotation with respect to dense operator function phase coordinate φ.

The probability of detecting Sugato pulse interfarometric wave dense with phase φ

$$\eta_1,\eta_2(\mathrm{J}|\mathrm{P},\varphi) = \overline{E_{\Phi_{\gamma_i \gamma_j}}} \,.\, J_{i,j} \tag{2}$$

Where $J_{i,j}$ being acts as induced interferometer.

SUGATO PULSE ACTED WITH SPIN FLIP TIME

Atom chips allow to trap ultra cold atomic gases in the vicinity of micron sized current carrying Wires [3] or permanent magnetic structures [8]. Micro fabrication techniques allow designing complex trapping potentials and to realize versatile manipulator of atoms thanks to the control of current or radiofrequency fields in the vicinity of the trapped cloud [9, 10]. Atoms chips are now considered as a powerful toolbox that can be used for fundamental studies [11, 12], atomic interferometry [13, 14] or quantum gate implementation [15].

In many such experiments, atoms are required to be very close to the surface of the tapping structure. Unfortunately, additional losses from the trap are experimentally observed in these conditions [16, 17]. Johnson- Nyquist magnetic field fluctuations at the position of the atoms, which can be induce Zeeman transitions towards untapped magnetic sublevels. This phenomenon is strongly enhanced in the near fields of conductors for typical Spin flip radio frequency (in the MHz range) [18, 19]. The simple case of infinite thickness conducting slabs (h→ infinity). The atom can decay toward an untapped state |f>,w being the frequency of the i→ f transition. The contribution of a semi infinite space to the spin flip rate can be calculated in the term of the field Greens functions [18], which is equivalent to evaluating the field radiated by the atom onto itself [20]. This field can be decomposed into propagating and evanescent plane wave (Weyl decomposition). Each of this wave is reflected by the surface according to Fresenel law.

The wave decomposition of qu-bit super conductivity with the contribution of wave decomposition in the quantum growth wave in the transition scale will be give high superconductivity transitions of atom chips. The wave decomposition will give into high microwave atom chips transition with the rotating Rydberg atom in the frequency incrimination in the shift phase transition with operative high field magnetization of Rydberg atom into the duel transfer function of quantum atom chip transition with its ground state excitation.

The response of Sugato Pulse decomposition with active integrated transfer function of excited atom with a coherence pulse module act as Rydberg ion chips of the state of vector v is null to infinity onto the decomposition of successive thin coherence growth [1] transformation. The current density of Freseuel law is succession of thin coherence growth.

$$\Gamma_{i,\gamma_f}{}^{ion\ chip} = \Gamma_{i,\gamma_f}{}^{0}\ (\omega)\left(\eta_{th\ rydberg} + 1\right)\ \mathrm{X}C_{4}^{3}\ \mathrm{Re}\left(\int_0^{\bar{\alpha}} d\gamma_q \frac{q}{\eta_0(q)} e^{2\Pi\Phi i\eta(q)k_0 d}\right)\ \mathrm{X}\left[r_{p_r}(q_1, q_2) - \eta^2{}_0(q_1) r_s(q) + 2q^2 r_\gamma(q)\right] \tag{3}$$

Where

$$\Gamma_{i,\gamma_f}{}^{0} = \mu_0 \left(\mu_{B_\gamma} g_{s_\gamma}\right)^2 K^3{}_0 \Big/ 24\Pi\bar{h}\Phi \tag{4}$$

Is the spin ion chips rate in the Rydberg atom in excited state to the vacuue state.

$\eta_{th} = \frac{1}{\left(e^{\frac{h\omega\gamma}{K_B T}} - 1\right)}$ is the mean photon number at frequency ω, μ_{B_γ} is the Bohr magnetron with pulse g_s the gyro magnetic factor of the electron. The integration factor g is such that q_0K is the modulus of the wave vector component parallel to the surface. Evanescent wave correspond to η >1.

THE RECONSTRUCTION PROCESS

The MaxLik reconstruction method seeks, in general, a density operator ρ maximizing the joint likehood of the results of all measurements carried out the function S_1 sensation of the diagonal elements of $\bar{\rho}$ only, but for the sake of generality we first describe the reconstruction method in terms of the full density operator. The sensation pulse acts onto the circular Rydberg atom operate. The sequence J field transformation with phase setting φ has been operator and $M_{\Phi_\gamma J_\gamma}$ is the number of times J has been obtained for this setting. The function $f_1(\gamma_1)_{\Phi j} = M_{\Phi_\gamma, j}$/M are the corresponding frequencies. The probability

$$f_1(\gamma_1)_{\Phi,j}\ \mathrm{J} = \left(M_{\Phi_\gamma,j}/\mathrm{M}\right).\varepsilon\left(\bar{\rho}.\overline{E_{\Phi_\gamma,J}}\right).\mathrm{Trace}S_1\left(\bar{\rho}, \bar{E}_{\Phi_\gamma,j}\right) = T_r S_1\left(\bar{\rho}, \bar{\varepsilon}_{\Phi_{i_{0\sim\bar{\alpha}}},j}\right) \tag{5}$$

Where we define the sensation of pulse

$$S_1 = \left(M_{\Phi_\gamma,j}/\mathrm{M}\right).\bar{E}_{\Phi_i,j} \tag{6}$$

Where S_1 is sensation of active pulse in the mode dense operator although

$$\sum_{\Phi_{0\sim\bar{\alpha}},j} \bar{\varepsilon}_{\Phi_i,j} = 1|1>0>\bar{\alpha} \tag{7}$$

Where the set of wave cloud dense bring acts as a linear sequential operator

$$f_{1_{\Phi_{i_\gamma},j}} = f_{2_{\Phi_{i_\gamma},j}} = f_{3_{\Phi_{i_\gamma},j}} = \ldots\ldots\ldots = f_{n_{\Phi_{i_\gamma},j}} = \mathrm{Trace}\left(\bar{\rho}_c \varepsilon_{\Phi_{\gamma c},j_c}\right) \tag{8}$$

An iterative algorithm leading to the density matrix maximizing ᾱ has been proposed as

$$\bar{\alpha}(\bar{\rho}_\gamma) = \prod_{(\Phi_i,j)} Tr\left(\bar{\rho}_{1_{\gamma}\ldots}\, \bar{\rho}_{n_\gamma}\, \varepsilon_{\Phi_i}, j\right) e^{\gamma_n f(\gamma_1)\ldots f(\gamma_n)} \tag{9}$$

The nonlinear $\bar{\rho}$ functional operator

$$\mathrm{P}(\rho_{\gamma_1\,\dots\dots\dots}\rho_{\gamma_n})=\sum_{\Phi_{0\sim\frac{3\Pi}{2},i_{\frac{3\Pi}{2}\sim 0}}} \frac{f_{1(\Phi_\gamma,j)\dots\dots}f_{n(\Phi_\gamma,j).}}{Trace\left(\left(\bar{\rho}_{1\gamma}\dots\bar{\rho}_{n\gamma}\right).\varepsilon_{\Phi_{i,j}}\right)} e^{\gamma_n f_{(\gamma_1)\dots}f_{(\gamma_n)}} \quad (10)$$

Which obviously reduces to the unity operator if $\bar{\rho}_c$ satisfies equation (8). The search density operator $\widetilde{\rho_c}$ thus satisfies.

$$\mathrm{P}(\bar{\rho}_{\gamma_1}\dots\bar{\rho}_{\gamma_n})(\rho_{\gamma_1})(\rho_{\gamma_2})(\rho_{\gamma_3})\dots(\rho_{\gamma_n}) \cong (\gamma_1)(\gamma_2)\dots.(\gamma_n)P(\bar{\rho}_{\gamma_1}\dots..\bar{\rho}_{\gamma_n})$$

$$\cong \mathrm{P}(\bar{\rho}_{\gamma_1}\dots\dots\bar{\rho}_{\gamma_n})(\rho_{\gamma_1}\dots..\rho_{\gamma_n})\mathrm{P}(\bar{\rho}_{\gamma_1}\dots\dots\bar{\rho}_{\gamma_n}) \cong (\rho_{\gamma_1}\dots\dots\rho_{\gamma_n}) \quad (11)$$

These expressions suggest obtaining $\bar{\rho}_{\gamma_1}$...........$\bar{\rho}_{\gamma_n}$ as the fixed point of the iteration

$$\bar{\rho}_{\gamma_{i+1}}=\tilde{P}(\bar{\rho}_1\dots..\bar{\rho}_n)(\rho_1\dots\dots.\rho_n)\ \tilde{P}\ (\widetilde{\rho_1}\dots\dots\widetilde{\rho_n}) \quad (12)$$

This is the photon distribution of the excited circular Rydberg atom with the sense of active Sugato Pulse. The iterative expression (12) ensures the positivity of the density operator at each step and is thus preferred in the general case. For diagonal density operators which will only interest one from now on, the simple iteration (12) is well distinguished. The convergence of density is operator act on a fixed unique point of (8). The iteration will be distinguished at the fixed float dense operator with the convergence series of dense mode pulse operator with distinct with chaotic pulse of circular Rydberg atom at the operative sequential pulse mode with the transfer continuum axis.

SUGATO PULSES ON ATOM INTERPOLATE AND EXTRAPOLATE ACTIVATION

The existence of pulse colour in the orbit pulse mode sensation within the existence of Time T' with transfer the pulse sensation in an equivalent transformation of mode pulse transformation with position existence and its probability distribution in the decoherence stage pulse act as a chaotic distribution in the resonance with sensation of zero value into the mode operator act as fully resonating pulse with $|\alpha_{\gamma_1}>$ sensation to the empty space resonances |0> in the coherence [1]. In the case of circular Rydberg atom the pulse in the wave chaotic in the phase of sensation pulse act in the orbit as a operator with G_1 entropy release function and the wave phase being dense with cloud photon density ρ_{γ_i} into the phase φ with its iterative function.

$$G_1 = \mathrm{Trace}\ (\rho_{\gamma_1}\ \rho_{\gamma_2}\ \rho_{\gamma_3}\ \dots\dots\dots\dots\ \rho_{\gamma_n}\ (\mathbf{log}\rho_{\gamma_1}\dots\dots\mathrm{log}\rho_{\gamma_1})) \quad (13)$$

In the wave chaotic the pulse act in high microwave low decoherence as extrapolate function into density operator act as active utility real value function

$$\mathrm{Trace}\ (\rho_{\gamma_1}\ \rho_{\gamma_2}\ \rho_{\gamma_3}\dots\dots\dots\dots\rho_{\gamma_n}) = 1 \quad (14)$$

Although low microwave high decoherence act as a interpolate function into as dummy time space photon transformation with $|\eta^{+}>,|\eta^{++}>$

$$\mathrm{Trace}\ ((\rho_{\gamma_1}\ \rho_{\gamma_2}\ \rho_{\gamma_3}\dots\dots\dots\dots\rho_{\gamma_n})\ (\eta^{+}>,|\eta^{++}>))=<n> \quad (15)$$

This shows the maximum photon scattered in the excited circular Rydberg atom. It should be no surprise than these are largely photon scattered in the transfer light wave transformation. In case of Sugato inter phase [7] due to wave chaotic the photon distribution will slow and give a colour noise in the decoherence state.

SUGATO PULSE CONDENSATION ON RYDBERG ATOMS

In recent experiment [21], a single Rydberg atom in an S-State with principal quantum number n ranging from 110 to 202 was created in a ^{87}Rb condensate of around N=80000 atoms. Its radius, scaling with ~ n^2, varies from 1 to 4 μm and is thus clearly within the resolution of optical imaging techniques. Furthermore, highly excited Rydberg atoms interact strongly via induced dipole-dipole forces. As a result, the Rydberg blockade [22] allows only a single Rydberg excitation at a time within the volume of the BEC in [21]. The single electron of a Rydberg atom polarized nearby atoms. The interaction potential, falling –off with a distance like $1/_{r^4}$, is of short range type. Hence a pseudo potential [23] [24] may be used to approximately describe the interaction energy between the electron and the surrounding ground state atoms

$$V_{\mathrm{Ryd}}(\vec{r}) = \frac{2\Pi h^2 a}{m_e} |\Psi_{Ryd}(\vec{r})|^{\mathbf{2}} \tag{16}$$

Where $\Psi_{Ryd}(\vec{r})$ is the Rydberg electron wave function, denotes the electron atom, S-wave scattering length and m_c is the electron mass, to a good approximation the reduced mass of atom electron system.

In the field ionization a sequential pulse act as the thin coherence zone of Sugato pulse [1] creates to the transfer pulse sensation to an orbit, though the orbit are in the positioning in the space cell will create to the sequential orbit vibration change into the field magnetization with the coherence of a state function. The wave in the state of decoherence act onto the orbital transfer function with a interpolate into the chaotic wave, the pulse into the photon transformation into the Bohr radius in fluctuated with a resonance of active wave pulse into the ground state circular Rydberg ions with the mixing e or g principal quantum number with the dense atomic sample nor the Rydberg blockade in account. The electron cloud will have to be condensing in the excited state of circular Rydberg atom with micro seconds with the decay of atomic dipole interaction in the atomic interaction with the measuring scale condensate of repeated wave transformation into 300 or 500 times [21] of cycle rotation. Heated by the wave coherence potential the condense undergoes losses the coherence into the orbit dipole interaction will give an rotation of circular Rydberg atom into the phase transformation 0 to 3Π/2 with the sense of condense pseudo pulse in the circular Rydberg atom as a transfer field coherence.

CONCLUSIONS

Circular Rydberg atoms in the Sugato Pulse mode will be the finding of its informatics wave dynamic and Rydberg ion chips of the state vector null to infinity onto decomposition of successive thin coherence growth transformation. The pulse of its reconstruction process with its density operator is in the sensation pulse and its iterative function. The Interpolate is finding maximum photon scattered in the excited circular Rydberg atom and extrapolates function find utility of real value function. Sugato pulse act also in the condensation of circular Rydberg atom.

REFERENCES

1. S. Ghosh Theory of Schrodinger cloud Equation IJPR Volume.3, Issue4 oct 2013,43-54
2. C. Sayrin, I Dotsenko, S. Gleyzes, M. Brune, J. M. Raimond and S. Haroche **14** (2012)115007
3. Fortagh. J. and Zimmermann. C. Rev. Mod. Phys **79**(2007)235
4. Rehaxek J, Hradil Z and Jezek M 2001 Iterative algorithm for reconstruction of entangled state Phys Rev. A **63** 040303

5. Lvovsky A I and Raymer M G 2009 Continuous- variable optical quantum state tomography Rev. Mod. Phys **81** 299-332
6. S. Ghosh Theory of Relativity on Pulse Quantum Phenomena IJPR Vol.3 Issue-5 Dec 2013 21-32
7. S. Ghosh Sugato Pulse acted on Rydberg atoms IJPR Vol-5, Issue-1 Feb 2015, 17-24
8. Hinds E. A. and Hughes I. G. J. Phys D, 32 (1999) R119
9. Hausel. W, Reichel. J, Hommelhoff. P and Hansch. T. W. Phys Rev Lett, **86** (2001)608
10. Shin. Y, Sanner C, Jo G. B., Pasquini T. A.; Saba. M; Ketterle W., Pritchard D. E. Vengalattore M and Prentiss M; Phys Rev A **72**(2005) 021604(R)
11. Schumm T; Hofferberth S; Anderson L. M; Wildermuth S; Groth S;Bar-Joseph I ; Schmiedmayer J and Kruger P; Nat. Phys ;**1**(2005) 57
12. Gunther A; Kraft S; Kemmier M; Koelle D; Kleiner R; Zimmermann C and Fortagh J Phys Rev Lett 95(2005) 170405
13. Treutlein P; Hommel hoff P; Steinmetz T; Hansch T. W; and Reichel J Phys Rev Lett 92(2004) 203005
14. JoG. B, Shin Y; Will S; Pasquini T. A; Saba M: Ketterle W; PritardD. E Vengalattore M; and Prentiss M Phys Rev Lett **98(**2007)030407
15. Calarco T; Hinds E. A; Jaksch D; Schmiedmayer J; Cirac J. I amd Zoller. P Phys Rev A**61**(2000)022304
16. Jones M. P. A; Vale. C. J. Sahagun D; Hall B. V. and Hinds E. A. Phys Rev Lett **91**(2003) 080401
17. Lin Y, Teper. I; Chin. C and Vuletic V. Phys Rev Lett **92**(2004)050404
18. Rekdal. P. K; Scheel. S; Knight P. L. and Hinds. E. A. Phys Rev A, **70** (2004) 013811
19. Henkel. C; Eur. Phys. J. D.**35**(2005)59
20. Haroche S; Cavity quantum electrodynamics in Fundamental system in quantum optics, Les Houches Summer School, Session LIII, edited by Dalibard J. Raimond J. M and Zinn-Justin J.(North Holland, Amsterdom)1992, P.767
21. J. B. Balewski; A. T. Krupp; A. Gaj;D. Petter; H. P. Buchler; R. Low. S. Hofferberth and T. Pfau Nature **502**,664(2013)
22. M. Saffman ; T. G. Walker and K. Molmer ; Rev Mod Phys **82** 2313(2010)
23. E. Fermi; Nuovo Cimento **11**,157(1934)
24. E. Fermi; Ric, Scientifica **7**,13(1936) Translated by G. M. Temmer in Enrico Fermi, Collected Papers Volume I university of Chicago Press,1962